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Letter to the Editor

'Bastion classification': Evolution of experience mandates caution when considering using class as predictor for method of temporary vascular control

We have read with great interest and applaud Jacobs and colleagues on their production and validation of a "Bastion score" to classify lower extremity injuries due to improvised explosive devices.[1] As the authors indicate, the ideal method of vascular control for class 3 injuries remains unclear. Jacobs and colleagues describe the use of iliac vascular control (either extra- or intraperitoneal) in a total of 51 of 177 limbs injured (46%). After review of the authors' findings, we conducted a retrospective analysis of lower extremity injuries cared for during the past 104 days during Op Herrick 15 and 16.

Table 1
Breakdown of Bastion class during study period (2 March–13 June 2012).

Bastion class	Number of extremities	Percentage of all extremities injured
1	0	0
2	8	7%
3	91	78%
4	12	10%
5	6	5%

Identical triage, resuscitative, and surgical strategies continue to be employed at Bastion hospital. During this time, we have cared for 67 patients with 117 injured limbs as a result of dismounted blast. A total of 41% ($n = 48$) of limbs injured resulted in traumatic amputation. Consistent with Jacobs report, class 3 injuries were the most common making up 78% of injured lower extremities (see Table 1). Proximal vascular control with temporary occlusion of iliac vessels via laparotomy was utilised in only 6 injured limbs (5% of all injured limbs; no patients underwent extraperitoneal iliac control). When considering Jacobs' manuscript, we noted that of 83 class 3 injured limbs without associated abdominal injuries, iliac control was utilised in 19 (23%). We found iliac control in this setting (class 3 injury without associated abdominal injury) necessary in only one patient (see Table 2). Whilst we agree that the classification system appears to be predictive of the initial musculoskeletal treatment, it was much less useful in predicting the need for proximal vascular control. As Table 2 indicates, the 6 limbs that had control of iliac vessels performed tended to be in patients with large injury burden (all had bilateral lower extremity injuries; all had associated injuries according to the ABCD component of the system). Our current approach for determination of method of obtaining vascular control is based on a combination of physiologic burden of injury, level of injury, need for intervention due to suspected abdominal injuries, and judgement and expertise of operating general and orthopaedic surgeons. This evolution in approach has contributed to the reduction in overall use of iliac control for lower limb injury. Other reasons contributing to this observed lower rate of this method of temporary vascular occlusion may exist. Injury mechanism has dictated widespread adoption of pelvic protective devices for ground troops. Pelvic protection has been shown in recent data analysis to contribute to a significant reduction in severe genitourinary injuries and likely has resulted in a decrease in perineal/pelvic haemorrhage (Oh JS, personal communication, 24 April 2012). In addition, similar group meetings and predeployment training have taken place to allow for discussion of techniques used and the associated risks and benefits of various methods of temporary proximal vascular control. These discussions have led our current group of deployed surgeons to determine that for thigh wounds amenable to proximal tourniquet application (i.e. class 3 injuries), separate incisions for exposure and occlusion of the iliac arteries are unnecessary in most cases.

We do not wish to recommend that there be a reluctance in obtaining vascular control proximal to the zone of injury in type 2 junctional haemorrhage or when the wounding pattern/physiologic burden of injuries make less aggressive methods of vascular control ineffective.[2,3] We simply feel that as our skill and expertise has evolved, and as wounding patterns change with the evolution of blast and protective devices, broad statements mandating such approaches when more distal control is reasonable may be inappropriate and avoid unnecessary risks of laparotomy. We again congratulate the authors on such a monumental classification system which is long overdue and will contribute to easier communication with receiving hospitals along the echelon of

Table 2
Data for limbs managed with temporary occlusion of iliac vessels.

Patient	Vessel controlled	Approach to vessel	Bastion class of injured extremity	Traumatic amputation	Associated injuries[a]	Outcome of injured extremity	Outcome of contralateral extremity
1	Right EIA	Laparotomy	5S	N	A, B, C, D	AKA	TKA
2	Right CIA	Laparotomy	3	Y	A, B, D	TKA	BKA
3	Right CIA	Laparotomy	4	Y	B, C	AKA	AKA
3	Left CIA	Laparotomy	3	Y	B, C	AKA	AKA
4	Right CIA	Laparotomy	4	Y	A	AKA (high)	BKA
5	Right EIA	Laparotomy	3S	N	A, D	No amputation	No amputation

AKA = above knee amputation; BKA = below knee amputation; CIA = common iliac artery; EIA = external iliac artery; TKA = through knee amputation.
[a] Bastion classification associated injuries: A = abdominal; B = genital/perineal; C = pelvic ring; D = upper limb.[1]

medical evacuation and improved outcomes. A continuation of prospective observation of the observed rate of each class, surgical management, and outcomes based on the Bastion classification and our added modification of presence of traumatic amputation at presentation is currently planned.

Conflict of interest statement

Neither author has any conflicts of interest to disclose.

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